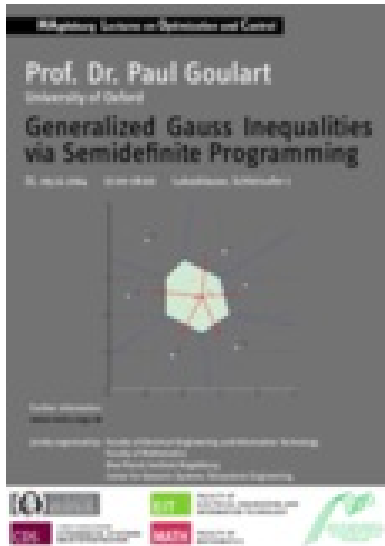


MAGDEBURG LECTURES ON OPTIMIZATION AND CONTROL

Paul Goulart



Generalized Gauss Inequalities via Semidefinite Programming

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Time & Place

The presentation on December 9, 2014 will be given in the Lukasklausur › (Schleierufer 1, 39104 Magdeburg) (<http://ifatwww.et.uni-magdeburg.de/syst/maloc/seminars/Standort%20Lukas%20Klausur.pdf>) and starts at 5.00 p.m.

Abstract

This talk will describe methods for computing sharp upper bounds on the probability of a random vector falling outside of a convex set, for situations in which limited information is available about the vector's probability distribution. Such bounds are of interest across many applications areas in control theory, mathematical finance, machine learning and signal processing. If only the first two moments of the distribution are available, then a sharp Chebyshev-like bound can be computed via solution of a single semidefinite program. However, the resulting bounds can be very conservative since they are typically achieved by a discrete worst-case distribution. The talk will show that considerable improvement is possible if the probability distribution can be assumed unimodal, in which case a less pessimistic Gauss-like bound can be computed instead. Additionally, both the Chebyshev- and Gauss-like bounds for such problems can be derived as special cases of a generalised definition of unimodality.

Short CV

Paul Goulart is an Associate Professor in Control Engineering in the University of Oxford. From 2011 to 2014 he was a senior researcher in the Automatic Control Laboratory at ETH Zurich, and from 2007 to 2011 a lecturer in control systems in the Department of Aeronautics at Imperial College London. He received BSc and MSc degrees in Aeronautics and Astronautics from the Massachusetts Institute of Technology (MIT). He was selected as a Gates Scholar at the University of Cambridge, where he received a PhD in Control Engineering in 2007. His research interests include model predictive control, robust optimization and control of fluid flows.